



### Suit sizing

New sizing rings on the Extravehicular Mobility Unit bring space suits into space station era. Story on Page 3.



### Teacher workshop

JSC friends, family spend a week in hands-on space activities. Story on Page 4.

# Space News Roundup

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## Atlantis to return to VAB for mating next week

Work continued at the Kennedy Space Center this week to prepare *Atlantis* for its mating to a pair of new solid rocket boosters and a new external fuel tank for blastoff around Sept. 12 on STS-79, the fourth docking mission with the Russian Mir Space Station.

*Atlantis* was returned to the Orbiter Processing Facility from the Vehicle Assembly Bldg. at KSC earlier this week to await final leak checks on the new set of boosters which was successfully completed. The shuttle will be rolled back to the VAB early next week to mate it with its new solid rocket boosters and external tank. *Atlantis* is scheduled to return

to Launch Pad 39A on Aug. 20 for final preparations before its six astronauts, Commander Bill Readdy, Pilot Terry Wilcutt and Mission Specialists Jay Apt, Tom Akers, Carl Walz and John Blaha, fly to KSC for a dress rehearsal of their countdown August 27 and 28.

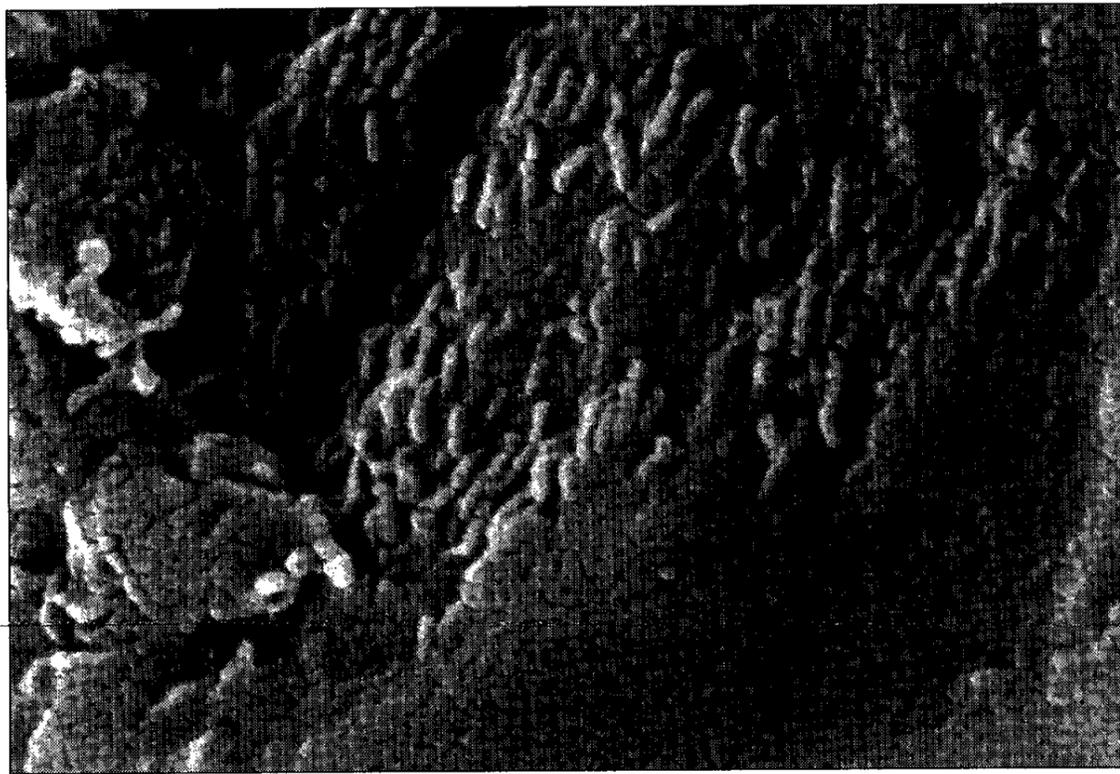
Blaha will replace U.S. Astronaut Shannon Lucid aboard the Mir once *Atlantis* has docked to the space station to begin a four and a half month tour of duty on the Russian complex. Lucid is completing her 20th week



aboard Mir, conducting a variety of life sciences and materials experiments. A new Mir crew, Commander Gennady Manakov, Flight Engineer Pavel Vinogradov and French Cosmonaut Researcher Claudie Andre-Deschays, will be launched in a Soyuz capsule on Aug. 17 to replace Lucid's crewmates, Mir 21 Commander Yuri Onufrienko and Flight Engineer Yuri Usachev. Onufrienko and Usachev will return to Earth with Deschays following a two-week handover in joining Lucid on orbit.

Lucid is scheduled to return to Earth with the STS-79 crew in the third week in September. A firm launch date for STS-79 is expected to be set Aug. 29.

Meanwhile, *Columbia* is undergoing routine processing for its launch around Oct. 31 on STS-80, a 16-day flight to deploy and retrieve both the ORFEUS-SPAS astronomy satellite and the Wake Shield Facility, in which thin film semiconductor material will be grown. Commander Ken Cockrell heads a five-person crew on the flight, which also will feature a pair of space walks to test assembly techniques for the International Space Station.



JSC Photos

Above: This electron microscope image is a close-up of the Mars meteorite. While the exact nature of these tube-like structures is not known, one interpretation is that they may be microscopic fossils of primitive, bacteria-like organisms that may have lived on Mars more than 3.6 billion years ago. Right: This image shows an unusual tube-like structural form that is less than 1/100th the width of a human hair in size found in the meteorite.

## Mars meteorite yields evidence of primitive life

By James Hartsfield

A research team of scientists at JSC and Stanford University has found evidence that strongly suggests primitive life may have existed on Mars more than 3.6 billion years ago.

The NASA-funded team found the first organic molecules thought to be of Martian origin—several mineral features characteristic of biological activity—and possible microscopic fossils of primitive, bacteria-like organisms inside an ancient Martian rock that fell to Earth as a meteorite. This array of indirect evidence of past life will be reported in the Aug. 16 issue of the journal *Science*, presenting the investigation to the scientific community at large to reach a future consensus that will either confirm or deny the team's conclusion.

The two-year investigation was co-led by planetary scientists David McKay, Everett Gibson and Kathie Thomas-Keprta of Lockheed-Martin, all from JSC, with the major collaboration of a Stanford team headed by Professor of Chemistry Richard Zare, as well as six other NASA and university research partners.

"There is not any one finding that leads us to believe that this is evidence of past life on Mars. Rather, it is a combination of many things that we have found," McKay said. "They include Stanford's detection of an apparently unique pattern of organic molecules, carbon compounds that are the basis of life. We also found several unusual mineral phases that

are known products of primitive microscopic organisms on Earth. Structures that could be microscopic fossils seem to support all of this. The relationship of all of these things in terms of location—within a few hundred thousandths of an inch of one another—is the most compelling evidence."

"It is very difficult to prove life existed 3.6 billion years ago on Earth, let alone on Mars," Zare said. "The existing standard of proof, which we think we have met, includes having an accurately dated sample that contains native microfossils, mineralogical features characteristic of life and evidence of complex organic chemistry."

"For two years, we have applied state-of-the-art technology to perform these analyses, and we believe we have found quite reasonable evidence of past life on Mars," Gibson added. "We don't claim that we have conclusively proven it. We are putting this evidence out to the scientific community for other investigators to verify, enhance, attack—disprove if they can—as part of the scientific process. Then, within a year or two, we hope to resolve the question one way or the other."

"What we have found to be the most reasonable interpretation is of such radical nature that it will only be accepted or rejected after other groups either confirm our findings or overturn them," McKay added.

The igneous rock in the  
 Please see **MARS**, Page 4



## Mir crew shares Olympic highlights

By Natasha Calder

Astronaut Shannon Lucid and her Mir 21 crewmates—Commander Yuri Onufrienko and Flight Engineer Yuri Usachev—spent this week sorting supplies, sharing Olympic highlights and conducting research.

Progress—the unmanned Russian supply capsule—was launched last Wednesday reaching the Russian Mir Space Station last Friday. The supply capsule delivered two tons of food, fuel and other items to the crew, including the care package of books and junk food requested by Lucid for her extra six week stay on Mir. Progress also carried with it experiment hardware for the upcoming Mir 22 mission.

The crew spent Saturday viewing

a package of highlights from the Olympic games, which included the opening ceremonies and several events in which both the Russians and the Americans won Olympic gold medals. During an interview last Thursday, the crew expressed their appreciation for the opportunity to view the games and congratulated all the Olympic athletes.

"We wish them the achievement of success that they have place before them in their trip to Atlanta and success in the future," Onufrienko said.

"We want to wish all of the athletes there at the Olympic games the best success and I hope that every single one of them returns home feeling that they have done their

very best and that they are very satisfied with the effort they put forth," Lucid added.

This week, the Mir 21 crew finished up many of its planned experiments and began setting up the experiments for the next Mir crew which is now set to launch about 8:18 a.m. Aug. 17 from Kazakhstan, Russia.

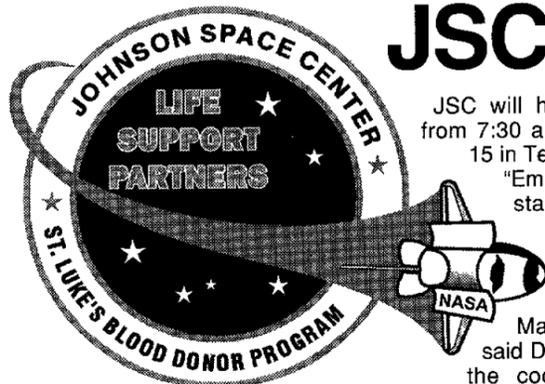
American Astronaut John Blaha, who will join the Mir 22 crew when *Atlantis* docks with the Russian outpost during STS-79, will leave this weekend to watch the launch of his crewmates, Commander Gennady Manakov, Flight Engineer Pavel Vinogradov and French Cosmonaut Researcher Claudie Andre-Deschays.

## JSC inventors to be honored

Thirty five center employees will be honored at noon Wednesday at the annual JSC Inventors Luncheon to be held at the Gilruth Center.

JSC Associate Director John Young, along with JSC's Patent Counsel Ed Fein, will present awards to employees whose NASA patents were issued in 1995.

Honorees include: Former JSC employee Frederic Dawn, Walter Guy and Joseph Kosmo of Engineering for the Method for Forming a Glove Attachment; Scott Swan of  
 Please see **LUNCHEON**, Page 4



A T-shirt with the new JSC, St. Luke's cooperative logo will be available to donors at the August blood drive.

## JSC hosts blood drive soon

JSC will host a blood drive from 7:30 a.m.-3:30 p.m. Aug. 15 in Teague Auditorium.

"Employees face a substantial challenge if they want to surpass the level of generosity they exhibited at the

May 23 blood drive," said Dan Mangieri, one of the coordinators for the drive. "The center broke all previous records for blood donations, with 300 employees taking time out to give blood."

Mangieri said donors can give

blood every eight weeks, with the whole process taking approximately 30 minutes under normal circumstances. The huge turnout at the last blood drive caused some unusually long lines, but St. Luke's promises to be prepared with more personnel to handle the crowds. Employees are encouraged to "bring a buddy."

There are many benefits to being a blood donor, Mangieri said. Under the St. Luke's agreement with JSC and contractors, the hospital provides blood assurance coverage for all JSC personnel and their immediate families. Many employees have benefited directly from the program.

Coverage includes all fees associated with blood products for blood transfused in any Houston area hospital.

As another bonus to donors, St. Luke's will send donors a card with information about their blood group, type and cholesterol level approximately three to four weeks after each donation. Donors also are notified of any positive results found during the regular series of tests performed on donated blood, including the tests for hepatitis and HIV. All test results are kept confidential. For details call Marty Demaret at x36007 or Dan Mangieri at x33003.

JSC

# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

**Houston Astros vs St. Louis Cardinals:** 7 p.m. Aug. 25 at the Astrodome. Mezzanine tickets cost \$14.50.

**EAA Mexico Copper Canyon Train Trip:** Nov. 6-12, \$995 per person, \$200 deposit required, final payment due Sept. 6.

**Sam Houston Race Park Track Pack:** \$10 value pack for \$5.25, includes Club Level seating, program, tip sheet, admission, preferred parking and gift shop discount.

**Splashtown:** One day pass cost \$14.25.

**Schlitterbahn:** One day pass cost \$19.75 for adults, \$16.95 for children.

**Astroworld:** One day pass cost \$22.75, two day pass cost \$34.25.

**Fiesta Texas:** One day pass cost \$22.75, two day pass cost \$34.25.

**Six Flags at Arlington:** One day pass cost \$22.75, two day pass cost \$34.25.

**Sea World:** Adult tickets cost \$24.50, children (3-11) cost \$17.25.

**Space Center Houston:** Discount tickets, adult, \$8.75; children (4-11), \$6.25, annual membership, \$22.95, family membership, \$59.95.

**Movie discounts:** General Cinema, \$4.75; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75.

**Stamps:** Book of 20, \$6.40.

**JSC history:** *Suddenly, Tomorrow Came: A History of the Johnson Space Center.* Cost is \$11.

**Metro tickets:** Passes, books and single tickets available.

**Special Event:** Splashtown NASA Family Days are Aug. 9-18. Tickets are on sale through Aug. 7, are good for one day only and cost \$9.95.

JSC

# Gilruth Center News

**Sign up policy:** All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

**EAA badges:** Dependents and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

**Fitness Challenge:** 1996 Fitness Challenge runs to Aug. 31. Employees are eligible to win \$100 gift certificates. For more information call Larry Wier at x30301.

**Defensive driving:** One day course is offered once a month. Cost is \$25. Interested employees should call the Gilruth.

**Stamp club:** Meets at 7 p.m. every 2nd and 4th Monday in Rm. 216.

**Women's self defense:** Martial Arts training for women only from 5-6 p.m. Tuesdays and Wednesdays. Cost is \$25 a month.

**Weight safety:** Required courses for employees wishing to use the weight room is offered from 8-9:30 p.m. Aug. 22. Pre-registration is required. Cost is \$5.

**Exercise:** Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays.

**Aikido:** Martial arts class meets from 6:15-7:15 p.m. Tuesday and Wednesday. Cost is \$25 per month. New classes begin first of each month.

**Aerobics:** Class meets from 5:15-6:15 p.m. Monday, Tuesday and Thursday.

**Ballroom dancing:** Cost is \$60 per couple. For details call the Gilruth Center at x33345.

**Country and Western dancing:** Beginner class meets 7-8:30 p.m. Monday. Advance class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

**Fitness program:** Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

JSC

# Swap Shop

## Property

Sale: 145.356 acs, Leon Co., Flynn, TX, trailer house well, electricity, 3 creeks, deer, \$900 acre. 643-0503.

Sale: Wooded lot, 90'x135', Taylor Lake Estates, can finance, \$39.5 obo. Don, x38039 or 333-1751.

Rent: El Dorado Trace townhouse, 1200 sq ft, 2-2.5-2C, W/D, FPL, \$675/mo. x34696 or 486-3980.

Rent: University Trace condo, 2-2, W/D conn, non-smoker/no pets, \$550/mo. x38889 or 480-1340.

Sale: Heritage Park, 3-2-2, brick 2-story home, below appraised value, by owner, \$77.5k. 482-8845.

Sale: Egret Bay condo, 1-1, appliances, FPL, new carpet, owner, \$29k. 339-2306.

Lease: Clear Lake, Oak Brooks, 4-2-5-2, no smokers/pets. \$1,250 mo. Jack H. Cohen, 499-3171.

Lease: Bay Knoll, 4-2-2, cul-de-sac, 2560 sq ft, avail 8/22, \$1.3k/mo + dep. x35021 or 486-7268.

Sale: Seabrook, 4-2-2A, fenced lot, new deck/shingles, FPL, gas furn/water heater, some new vinyl/carpet. George, x35398 or 474-7021.

Rent: South Lake Tahoe cabin, sleeps 8, 3-2, cable TV/VCR, microwave, modern kitchen, W/D, \$75/night, w/ky & holiday rates. x41065 or 326-2866.

Sale/Rent: Boat slip on Clear Lake w/roof & motorized boat hoist for pwr boats, \$7.5k. 474-4922.

Lease: CLC Oakbrook, 4-2-5-2, on golf course, no smokers or pets, \$1250/mo, avail now. Jack H. Cohen, 488-3171.

## Cars & Trucks

'50 Chevrolet 3/4 ton truck, \$2.2k. 286-5971.

'89 Ford F-150, loaded, A/C, pwr, cruise control, AM/FM/cass, 53k mi, \$7.2k. Bob Wirt, 332-4756.

'85 5-10 Blazer, V6, A/C, good cond, 153k mi, \$2.2k obo. x30120.

'86 Honda Accord LX, 5 spd, 4 dr, fully loaded, 138k mi, grey/grey, good cond, \$2.5k. 480-6743.

'83 Dodge Ram van, very dependable, custom inter, no A/C, \$1.4k. Ken, x31496 or 286-7583.

'91 Volkswagen Corrado Sports car, metallic grey, pwr everything, 56k mi, \$10.9k obo. Kerry, 721-6054.

'72 Corvette convertible, 92k mi, frame on restoration, 350, 4 spd, 2 tops, \$17.5. x34681 or 286-5816.

'88 Ford Escort, new tires, A/C, AM/FM/cass, not working, \$750. x33282 or 480-9806.

'91 Isuzu PU, A/C, 5 spd, clean, \$4,250. x39527 or 538-3483.

'89 Pontiac Sunbird, 4 dr, auto, A/C, ex cond, new tires, \$2,795 obo. Ayub Khan, x39199 or 910-6700.

'84 BMW 318i, 5 spd, sunroof, white, good cond, A/C, \$3,850 obo. x35590 or 991-0821.

'72 Karmann Ghia Coupe, ex cond, 1600cc engine, 4 spd, \$3k obo. x31440 or 333-5693.

'91 Olds Cutlass Clera, V6, 4 dr sedan, ex cond, 68k mi, A/C, AM/FM/cass, auto, pwr, cruise, \$5.5k obo. x31695 or 532-1089.

'90 Acura Integra GS, white/black, 5 spd, 33k mi, stereo/cass, sunroof, new tires, ex cond, \$12k. Bill, x31926 or 992-2917.

'87 Chevy Cavalier, very clean, A/C, runs good, 113k mi, \$1.9k obo. x31440 or 333-5693.

'87 Buick Park Ave, V6, cruise, all pwr, lots of new equip, tires, \$3.5k firm. Ginger, x38493 or 332-7908.

'67 Mustang Coupe, factory rebuilt 289, \$4.8k. 482-8286.

'78 Buick Riviera, 75th anniv car, silver/black w/leather inter, 403 cu in. V8, \$800. x35189 or 326-3706.

'84 Camero, V6, new paint, rebuilt eng, A/C, new starter, \$2,995. x33814 or 481-5822.

'76 F-100 PU, good work truck, \$950. x31883.

'85 Honda Accord, 4 dr, std, cruise, AM/FM, clean, good maint, dependable, \$2,150. 334-4470.

'80 Toyota 4x4 PU, 1 owner, never wrecked, very

dependable, \$1.9k obo. Mark, x33165 or 332-6966.

'95 Chevy Silverado ext cab, 3/4 ton, low mi, loaded, V8, white, alarm, extras, \$21.9k. Scott, 326-4357 or 326-2034.

'95 Ford F-150XL PU, ex cond, 11k mi, warrantly, \$13,995. x32264 or 488-2184.

'88 Dodge Aries K, 4 dr, new radiator/batt/hoses, dependable, \$1.5k obo. Greg, x34391 or 335-8098.

## Boats & Planes

'Prindle 16' Catamaran, upgraded trampoline, dbl trapeze, many new lines, good sails, galv trailer, \$1k. Paul, x30869.

'14' Jon boat, 7.5Hp, trailer, \$800. 996-8939.

'88 Sea Ray Seville 18' bowrider, 130Hp I/O, pwr trim/tilt, pwr steering, steel speed prop, swim platforms, bimini top, AM/FM, galv trlr, ex cond, extras, \$8k. x48959 or 532-1673.

1/4 ownership in Grumman Cheeta AA5-A, 140 mph, 2550 TT, 550 SMOH, auto gas, 2 nav com's, GS, ADF, transponder, GPS, new inter, \$9k. 480-4359.

## Cycles

Kawasaki 550 LTD, 5.4k mi, shaft drive, mint cond, \$1,250 obo. x34681 or 286-5816.

'84 Kawasaki 750 GP2 Turbo, 3.5k mi, \$2,650. x34681 or 286-5816.

'96 Suzuki Intruder 800, Jardine pipes, Corbin gunfighter saddle, eng guards w/hvy pegs, sissy bar rack, 6k mi, \$5.9k. x39022 or 334-1595.

Boys 16" Huffly Mud Slinger bike, peddle brake, handbrake, crossbar padding, training wheels, \$25. Rich, x47257 or 996-7630.

Schwinn Highplains Mt bike, 23" frame, 26" wheel, jelly seat, ex cond, \$200. Walt, x36353.

## Audio Visual & Computers

US Robotics Sportser ext modem for PC/Windows, 28.8k, \$140. 244-2444 or 488-4382.

DX2-66 & DX4-100, 8Mb/850Mb, mini twr, 14" mon, \$695/745; Pentium 75/100/133/166, 14" mon, 16Mb/850Mb, all have Win 3.11 or Win 95-Office, S/W, \$895/969/1069/1249. Don, 333-1751.

MacPower PC's, 6220, 6205, 6290, 16Mb RAM, 16b HD, ex cond: Softwindows '95 for PPC, \$125; Teleport Platinum, 28.8k ext fax/modem for Mac, \$140. Bobby, 244-2444 or 488-4382.

Multimedia Pentiums, 75/100/133/166, 16Mb/1Gb, 2Mb PCI videocard, 6X CD soundcard, 28.8 fax/modem, 14" mon SVGA .28 res mini twrs, Win 95, \$1175/1225/1345/1495. Ayub, x39199 or 910-6700.

386DX40, 4Mb RAM, 170 Mb HD, 3.5 & 5.25 FD, mouse, 14" SVGA mon, \$350; 486DX2-66, 4Mb RAM, 426Mb HD, 3.5 & 5.25 FD, 15" SVGA mon, \$600; 15" SVGA mon, \$125. Charles, x36422 or 326-5073.

Macintosh Power Book 520C w/case, loaded, ex cond, \$1.4k obo; CD ROM Writer-Kodak, ex cond, \$1.5k obo. x32920 or 610-9282.

Packard Bell 386sx16, 4Mb RAM, 105Mb HD, VGA mon, Panasonic KXP 1123 24-pin dot matrix printer, case of paper, DOS 6.22, Win 3.1 & MS Works, \$320 obo. Curt, x41065 or 326-2866.

Satellite receiver/descrambler, Tracker V satellite disk & controller, \$250. 337-4182.

Phantasmagoria game software, 7 CD set, \$35. Roy, x34094 or 992-5414.

Compaq Deskpro 486 w/lots of extras, ex cond, \$1.5k obo. x32920 or 610-9282.

Panasonic KPX-1124i, 24-pin, 360 dpi, dot-matrix printer, \$75 obo. Gus, x33425 or 286-3402.

Kodak CD ROM writer, like new, was \$5k, now \$1.5k obo. x32920 or 610-9282.

## Today

**Reservations due:** A luncheon will be given honoring the JSC inventors of 1995 at noon Aug. 14 at the Gilruth Center. Cost is \$8.60. Reservations are due Aug. 9. For more information, call Mara Pena at x30837.

**Reservations due:** The Clear Lake/NASA Area Chapter of Professional Secretaries International will hold a dinner workshop at 5:30 p.m. Aug. 14 at the Holiday Inn on NASA Road 1. Maureen Giacchino will discuss "Gender Sensitive Communication." Cost is \$20 for both dinner and the workshop, or \$10 for the workshop. Reservations are due by noon Aug. 9. For more information call Juanita Woodfox at 286-3346.

**Cafeteria menu:** Special: meat sauce and spaghetti. Total Health: baked potato. Entrees: rainbow trout, liver and onions, beef cannelloni, ham steak, fried cod fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, black-eyed peas.

## Monday

**Cafeteria menu:** Special: turkey and dressing. Total Health: herb flavored steamed pollock. Entrees: breaded veal cutlet, chicken fajitas, steamed pollock, beef, French dip sandwich. Soup: beef and barley. Vegetables: Brussels sprouts, mixed vegetables, egg plant casserole, winter blend vegetables.

## Tuesday

**NMA class:** The Texas Gulf Coast Council of National Management Association is hosting a 10-hour money management seminar from 6-9 p.m. Aug. 13 and 20 at 600 Gemini, Aug. 15 at 16665

Space Center Blvd. and Aug. 14, 21 and 28 at 2400 NASA Road 1. Cost is \$50 per couple for members and \$75 per couple for non-members. For more information call Richard Hergert at 280-0444.

**BAAC meets:** The Bay Area Aero Club will meet at 7 p.m. Aug. 13 at the Houston Gulf Airport in League City. For more information call Jerry Adair at x38058.

**Cafeteria menu:** Special: pepper steak. Total Health: barbecue chicken. Entrees: baked lasagna, pork chop and fried rice, turkey a la king, baked chicken, fried cod fish, French dip sandwich. Soup: black bean and rice. Vegetables: breaded squash, steamed spinach, baby carrots, navy beans.

## Wednesday

**Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. Aug. 14 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich x45752.

**MAES meets:** The Society of Mexican American Engineers and Scientists will meet at 11:30 a.m. Aug. 14 in the Bldg. 3 Cafeteria executive dining room. For more information call Michael Ruiz at x38169.

**Astronomy seminar:** The JSC Astronomy Seminar will meet at noon Aug. 14 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information call Al Jackson at x35037.

**Cafeteria menu:** Special: Mexican dinner. Total Health: steamed pollock. Entrees: broccoli cheese quiche, spare ribs and sauerkraut, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: Spanish rice, pinto beans, peas, broccoli.

## Thursday

**Blood drive:** JSC will host a blood drive Aug. 15 in Teague Auditorium. For more information call Marty Demaret at x36007.

**Directors meet:** The Space Family Education board of Directors will meet at 11:30 a.m. Aug. 15 in Bldg. 45 Rm. 712D. For more information on this open meeting call Gretchen Thomas at x37664.

**Cafeteria menu:** Special: hamburger steak with onion gravy. Total Health: baked potato. Entrees: corned beef, cabbage and new potatoes, chicken and dumplings, meat ravioli, French dip sandwich. Soup: broccoli cheese and rice. Vegetables: navy beans, cabbage, cauliflower, green beans.

## Friday

**Cafeteria menu:** Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

## Aug. 21

**Scuba club meets:** The Lunarfinns will meet at 7:30 p.m. Aug. 21 at Redfish Restaurant under the Kemah/Seabrook Bridge, Seabrook side. For more information call Fred Toole at x33201.

## Aug. 22

**NASA open forum:** NASA will conduct an open forum meeting to solicit responses concerning NASA's procurement policies and practices from 2-4 p.m. Aug. 22 at the Teague Auditorium. For more information call the JSC Industry Assistance Office at x34511.

Entertainment center, wood, contemp, whitewash finish, accomm 30" TV, drawers/trays/smoked glass doors, ex cond, \$225. Gus, x33425 or 286-3402.

Couch & loveseat, 2 end tables, \$100; 2 dressers, \$35; stove, \$100; refrigerator, \$75. 470-9497.

GE gas dryer, good cond, \$100. Diane, x33296 or 488-7858.

## Wanted

Want Waverunner with mechanical problems. Ken, x31496 or 286-7583.

Want professional non-smoking, male, roommate to share 2-2 townhome in Pearland, \$350 mo + 1/2 utilities. John, 997-8796.

Want non-smoking roommates to share 3-2-2, Webster, \$340 mo all utilities, except phone, prefer students. 332-8417.

Want housemates, 2 BDRs avail, share bath, pool & jacuzzi, \$300 + 1/4 elect, non-smoking. Ken, x31496 or 286-7583.

Want housemate to share 3-2.5, 4-story waterfront townhouse, includes amenities, boat slip, \$550 mo + 1/2 utility. Terry, x39234 or 335-0113.

Want non-smoking roommate to share 4-2-2, CLC, \$275 + sep phone, \$100 dep. 488-6493.

Want personnel to join CPSI Vanpool, departing South Braeswood Park & Ride lot: 6:50 am for JSC & offsite locations, 7:30 - 4:30 shift. Susan Gaynor, 282-5447 or Al Ruder, x34997.

Want personnel to join VPSI vanpool departing Meyerland Park & Ride at 7:05 am for JSC, vanpool consists of on-site personnel working 8 am - 4:30 pm shift. Don Pipkins, x35346.

Want '74-'78 Chrysler 75-90Hp O/B motor working or not, for parts. George, x35398 or 474-7021.

Want 22 target rifle for training program. Charles, x37678 or 661-4789.

Want plans to convert lawn mower eng into A/C pwr gen for emergency backup, need help installing ceiling fans in home, Steve, x37152 or 992-7049.

Want antique fishing lures. Tim, x38843 or 409-925-0011.

Want portable deer hunting stand. Mike, x47656.

Want pop-up camper with A/C, good cond, must sleep 8. Daryl, x35362 or 409-922-8106.

Want arcade Galage machine, cocktail or standup, working or almost working cond. 286-4255.

## Miscellaneous

Meade 8" reflector telescope w/finder scope & motor drive, access, ex cond, \$700. 585-4268.

Bally's Membership, \$500. Cyndi, 338-4774.

Century Quick-Fix wire feed welder, 120 volts, ex cond, includes mask/gloves/wire, \$400. 991-0821.

ARE fiberglass camper top fits full size long wide bed Chevy/GMC, front slider win, side slider wins w/screens, ex cond, \$475. x38084 or 482-6985.

Duraliner bed liner fits full size long wide bed Chevy/GMC, ex cond, \$120; Free KX-80 dirt bike good for parts. x38084 or 482-6985.

Doorlocks w/built-in sec full 1" deadbolt, 2 sets both ex cond, \$25 ea. x32920 or 610-9282.

One low profile P205/60R15 Goodyear tire w/alum alloy wheel for '89 Ford Escort GT, \$50. David, x47080.

Delta 8" drill press, bench top, ex cond, \$60. Alyson, x48530 or 486-4663.

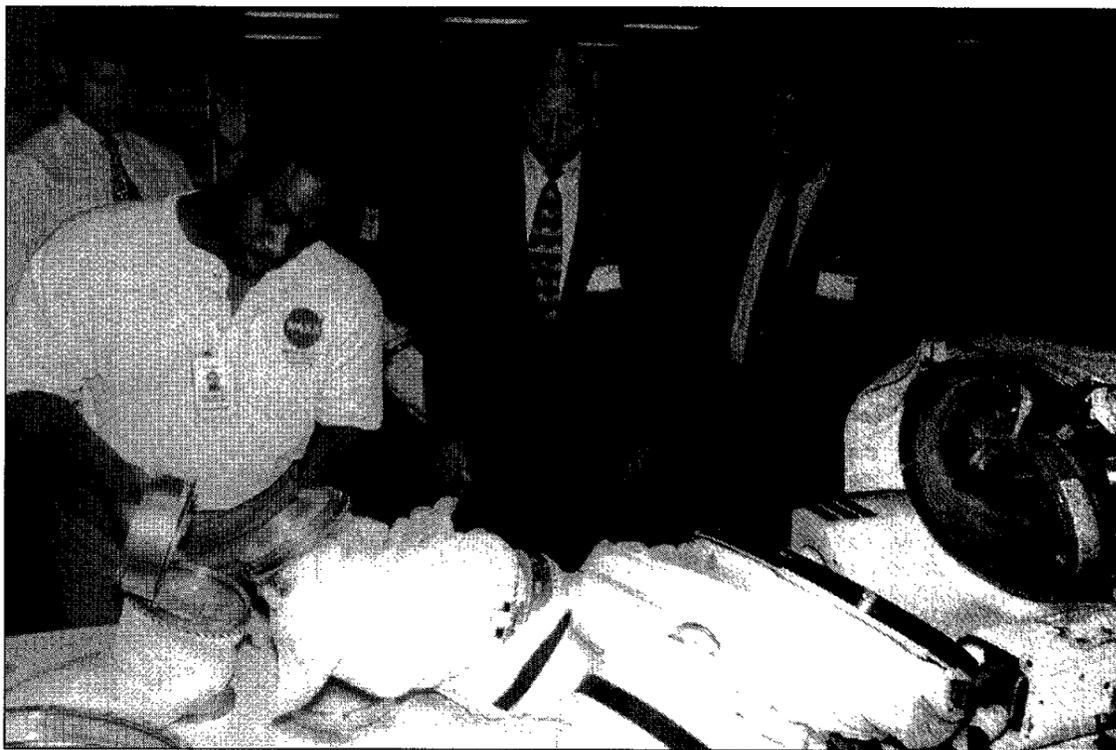
Murray 21" lawnmower, \$125; hose cart, hose, sprinkler & nozzle, \$25; True Temper spreader, #20, ex cond. 532-1559.

Kitchen table w/4 chairs, ex cond, \$75 obo. electric lawnmower, ex cond, \$75 obo. Louis, x335-8676.

Igloo doghouse, \$35; trundle bed w/cover and pillows, \$150. 332-4756.

# Suit Sizing

## New space suits can be sized in space saving storage, deliveries



By Karen Schmidt

The STS-79 mission will carry into orbit a new space walking suit designed to fit more than one astronaut and save storage space, bringing tomorrow's International Space Station technology into today's missions.

Extravehicular Activity space suits are the astronauts' life blood when they must work outside the protected environment of a space shuttle. Equipped with life support, an astronaut can spend up to seven hours performing maintenance tasks in the shuttle's cargo bay or on the future space station. With EVA tasks expected to increase during station assembly and operation, JSC, in cooperation with Hamilton Standard, ILC Dover, Air-Lock and Boeing Aerospace Operations, is revamping space suits to save storage space, meet weight limits and reduce the amount of equipment required on flights to the station.

One of the first phases of the redesign was to develop a way to resize a suit faster on the ground and in orbit. Currently, ground technicians change suit sizes by lacing in different lengths of fabric inserts.

"In order to make a suit fit an astronaut, technicians must change the inserts in the arms and legs of a suit," said Ralph Anderson of the Flight Crew Equipment Management Office. "It is a long and cumbersome process that takes about 16 hours to prepare a suit for a particular astronaut."

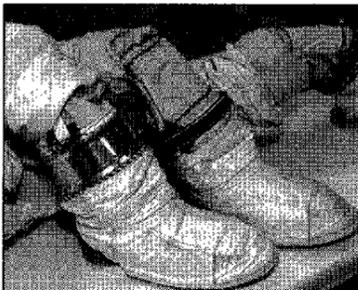
Astronauts also are trained to change-out inserts in the suits, but the process is slow and tedious, taking up valuable on-orbit time. The new design features sizing rings in both arms and legs that can be changed out in less time.

"With the enhanced sizing rings, a suit technician can change the size of a suit in

less than 20 minutes," Anderson added.

Not only can suit technicians change the size of an EVA suit, the astronauts on orbit will have the same capability.

"That's the whole idea, multiple crew members can use the same suit for space walks on the International Space Station," Anderson said.



The new rings, made of aluminum, are available in 1/2 size at the arm and thigh and three different sizes for the lower leg—1/2, 1 and 1 1/2 inch. There also are four different sizes of leg segments and eight sizes of lower arm segments that the astronauts can choose from. One leg

attachment that fits from thigh to ankle can be sized up to three inches—with so many combinations, a single suit can be sized to fit a number of astronauts.

"We will be able to carry a couple of suits and leave them on the space station with enough sizing components to fit different astronauts, thereby eliminating the need to carry suits for specific astronauts on every flight," said Rodney Johnson, lead for the Training Extravehicular Mobility Unit Laboratory at Boeing.

The design of the sizing rings evolved from rings used on an advance development suit. The major difference is that the new rings are threaded and twist on. Each ring has two automatic spring locks and one manual lock.

"The new ring uses a pressure seal that is an adaptation of the static seal that we have been using for a decade and a half in disconnects found at the neck, gloves and



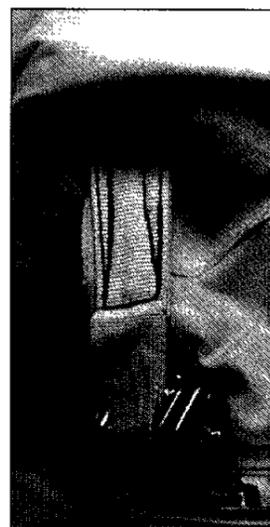
waist," said Don Lacey of ILC Dover.

"Adapting proven designs reduced our learning curve tremendously. The suit was designed to meet the space station mission, but we will begin to reap the benefits of this new suit right away."

In addition to the new rings, Adjustable Restraint Brackets also are being used for the first time. They allow astronauts to lengthen or shorten the arm and leg segments in smaller increments than the rings.

"You can lengthen either end up to one half inch," said Scott Cupples of ILC Dover, "giving an astronaut a custom fit."

The suits will fly for the first time on STS-79, but the big test will be on STS-82 when they will be used during scheduled space walks to service the Hubble Space Telescope. Because the position of the airlock on *Discovery* during STS-82 effects its center of gravity, mission managers asked if only three suits could be flown for the four space walking astronauts.



Mission Operations STS-82 EMU Lead Paul Boehm and back-up Dana Weigel were able to answer 'yes' because of the new sizing capabilities. Mission Specialists Joe Tanner and Steve

Smith will share one suit, bringing enough sizing rings and leg attachments to custom fit the two space walkers.

"We are relying on these rings to accomplish a resize in a much shorter time," Boehm said. "It is going to be nice to have

the capability to do this on orbit, it gives us a lot more flexibility and helps us focus on the primary objectives of the mission."

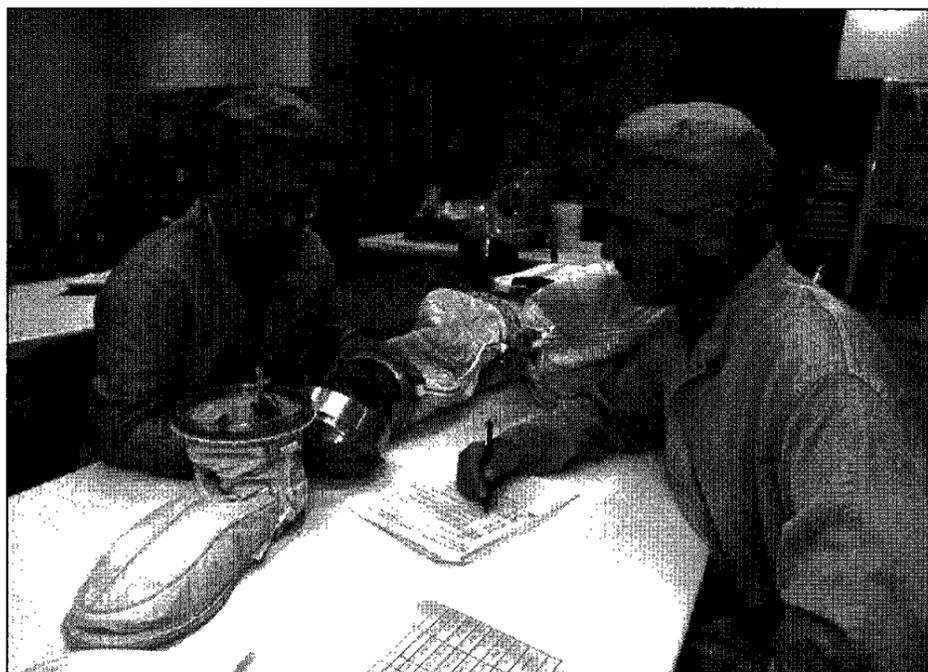
"The sizing rings add a new, much needed capability to resize the EVA suits in flight," Tanner said. "This capability

allows us to carry only three suits to accommodate four EVA crew members. The rings are very easy to use, requiring only a few minutes to change arm and or leg segments to fit another crew member. The rings don't restrict your motion in the suit in any way, in fact, I can't even tell they are there. Other modifications that go along with the enhanced EMU allow crew members to make minor adjustments to arm and leg segment lengths that could previously only be made by a ground technician. The end result is a better suit with more capability and flexibility to carry

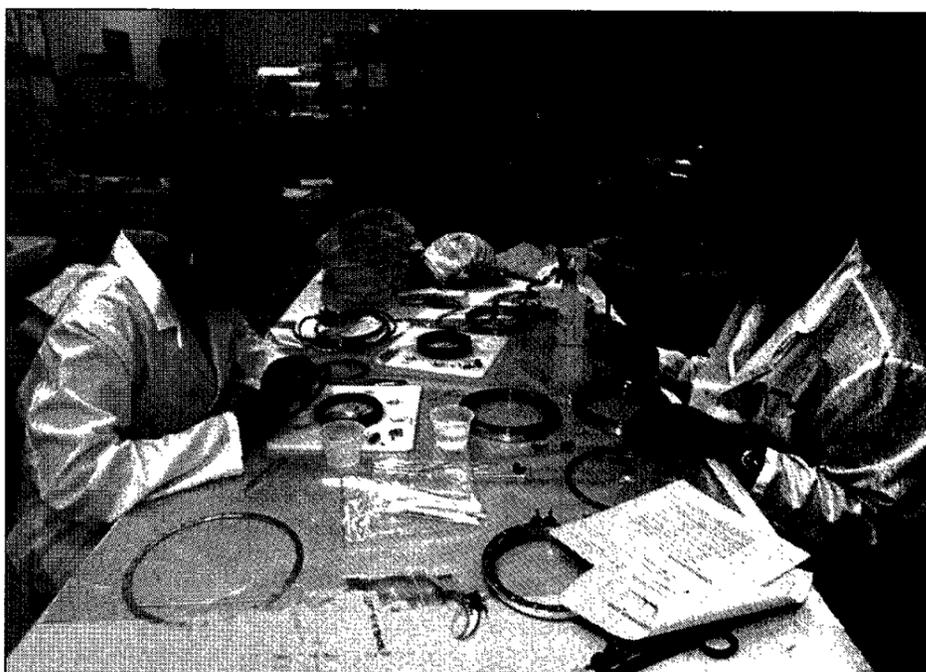
us into the station era."

More redesigns are in the works. The Hard Upper Torso, or HUT, will be fitted with new quick disconnects instead of bolt on attachments that connect the Primary Life Support System. These quick disconnects are expected to work better and faster and the pivot points at the shoulders of the current HUT will be deleted to give the astronauts better mobility and make the suit more robust. The new designed HUT also will remove four possible failure points that now exist in the older model.

"If we had a space station today, this suit would be ready to fly," said Tony Wagner, spacesuit subsystem manager in the Crew and Thermal System EMU Group. "We could leave it on the station for many space walks before it would have to return for maintenance. It is certified and ready to go for EVA." □



From top to bottom, left to right: 1) From left, Rodney Johnson, lead for the Training Extravehicular Mobility Unit Laboratory at Boeing Aerospace Operations, demonstrates how the new enhanced sizing rings work to NASA Deputy Administrator John Dailey and JSC Director George Abbey. 2) The new rings replace fabric sizing inserts that were hand laced into the suit by technicians, taking up to 16 hours to resize one suit. 3) Another new design feature is an



Adjustable Restraint Bracket that gives astronauts a second length adjustment feature in the arms and legs of a space suit. 4) Leg rings come in three different sizes assuring a custom fit for the astronauts. 5) From left, Robert Nicholson and Ron Lindsey prepare a suit in the flight EMU laboratory for STS-79. 6) From left, Latonya Hagler and Nicholas Barnett check an arm ring assembly.

# Mars fossils may reveal new insights into past life

(Continued from Page 1)

4.2-pound, potato-sized meteorite has been age-dated to about 4.5 billion years, the period when the planet Mars formed. The rock is believed to have originated underneath the surface and to have been extensively fractured by impacts as meteorites bombarded the planets. Between 3.6 billion and 4 billion years ago, a time when it is generally thought that the planet was warmer and wetter, water is believed to have penetrated fractures in the subsurface rock, possibly forming an underground water system.

Because the water was saturated with carbon dioxide from the Martian atmosphere, carbonate minerals were deposited in the fractures. The team's findings indicate living organisms also may have assisted in the formation of the carbonate, and some remains of the microscopic organisms may have become fossilized, in a fashion similar to the formation of fossils in limestone on Earth.

Then, 15 million years ago, a huge comet or asteroid struck Mars, ejecting a piece of the rock with enough force to escape the planet. For millions of years, the chunk of rock floated through space. It encountered Earth's atmosphere 13,000 years ago and fell in Antarctica as a meteorite.

It is in the tiny globs of carbonate that the researchers found a number of features that can be interpreted as suggesting past life. Stanford found easily detectable amounts of organic molecules called polycyclic aromatic hydrocarbons, or PAHs, concentrated in the vicinity of the carbonate. Researchers at JSC found mineral compounds commonly associated with microscopic organisms and the possible microscopic fossil structures.

The largest of the possible fossils are less than 1/100th the diameter of a human hair, and most are about 1/1000th the diameter of a human hair—small enough that it would take about a thousand laid end-to-end to span

the dot at the end of this sentence. Some are egg-shaped while others are tubular. In appearance and size, the structures are strikingly similar to microscopic fossils of the tiniest bacteria found on Earth.

The meteorite, called ALH84001, was found in 1984 in Allan Hills ice field, Antarctica, by an annual expedition of the National Science Foundation's Antarctic Meteorite Program. It was preserved for study in JSC's Meteorite Processing Laboratory and its possible Martian origin was not recognized until 1993. It is one of only 12 meteorites identified so far that match the unique Martian chemistry measured by the Viking spacecraft that landed on Mars in 1976. ALH84001 is by far the oldest of the 12 Martian meteorites, more than three times as old as any other.

Many of the team's findings were made possible only because of very recent technological advances in high-resolution scanning electron microscopy and laser mass

spectrometry. Only a few years ago, many of the features that they report were undetectable. Although past studies of this meteorite and others of Martian origin failed to detect evidence of past life, they were generally performed using lower levels of magnification, without the benefit of the technology used in this research. The recent discovery of extremely small bacteria on Earth, called nanobacteria, prompted the team to perform this work at a much finer scale than past efforts.

The team of researchers includes a wide variety of expertise, including microbiology, mineralogy, analytical techniques, geochemistry and organic chemistry, and the analysis crossed all of these disciplines.

More information on the meteorite is available on the Internet at URL: <http://www.jsc.nasa.gov/pao/flash/> or its mirror sites: <http://cu-ames.arc.nasa.gov/marslife/> and <http://rsd.gsfc.nasa.gov/marslife/>

## JSC friends, family study space science

Friends and family members of JSC workers know more about the space program after spending a week in a hands-on workshop.

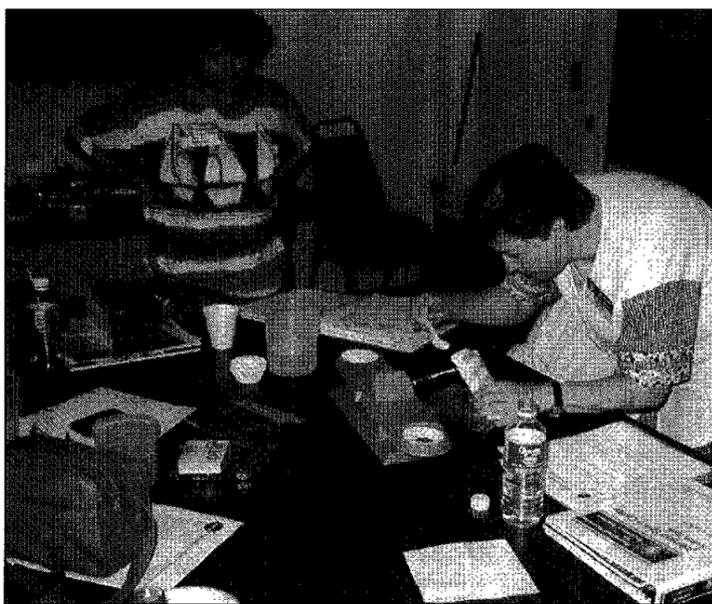
"It's our job, as educators, to educate our students to the fullest," said Jan Scanlon, a member of the teacher certification program at the University of Houston Clear Lake and sister of Mark Mangieri of Engineering. "That's where NASA comes in and helps us learn about the resources available to influence our children."

More than 40 educators spent a week at JSC learning about a variety of space subjects and the work done at JSC. The family and friends program was so popular this year that the education specialists in the Education and Information Services Branch of the Office of Public Affairs extended the program and offered two one-week workshops to accommodate all the requests.

Educators, who attended the first workshop, spent a week touring facilities, participating in classroom sessions and even attended the Early Human Testing Initiative briefing last week. Before the briefing the group visited the 20-foot chamber.

"The Regenerative Life Support facility was very exciting," said Susan Jennings, a teacher at Creekside Intermediate and friend of JSC's Labor Relations Officer Connie Pritchard. "Many thanks to Nigel Packham and Pat O'Rear for their time and for a great tour."

"The Regenerative Life Support program will inspire my students toward terrific science projects," said Pam Doiron, a teacher at Faith Christian Academy in Pasadena and a friend of Karen Wyont of Support Operations.



From top to bottom, left to right: From left, Susan Jennings, an eighth grade teacher at Creekside Intermediate School watches Brenda Babin, a secondary teacher from Gonzales Primary School in Louisiana, rehydrate food much the same as astronauts in space. The goal of the experiment is to examine the difference between the taste and consistency of space food with food prepared on Earth. Janice Scanlon, a member of the teacher certification program at the University of Houston Clear Lake, examines the cockpit of JSC's T-38. Jennings tries on a launch/entry suit during the workshop.

JSC Photos by Mae Mangieri

## Two winter vacations available to employees

Employees who vacation in January may want to consider too JSC discount packages that are now available.

The Employee Activities Association is sponsoring a Caribbean Getaway. This is an 11 day cruise from San Juan, Puerto Rico on the Celebrity cruise ship Meridian. JSC employees may take the cruise after Jan. 3 at a cost of \$1198, double occupancy. Cost includes round trip air from Houston Intercontinental Airport to San Juan, Puerto Rico, and 10 nights aboard the Meridian cruise ship. Stops will be made in Aruba, La Guaira, Grenada, Barbados, St. Lucia, Martinique, St. Maarten and St. Thomas before returning to San Juan.

An initial deposit of \$30 per person is required at signing up, followed by a second deposit of \$270 due on Sept. 5. Final payment must be made by Nov. 4. Employees may sign up at Friendswood Travel located in Bldg. 1 Rm. 134. For information call Dick McMinimy at x34037.

In addition, the sixth NASA ski week is set for Jan. 18 at Steamboat Springs, Colo. The package price of \$1064 per person includes round-trip airfare from Houston Intercontinental Airport to Hayden, Colo.; ground transfers from Hayden to the hotel on Alpine Express; seven nights lodging at the Thunderhead or Ptarmigan hotel, and five ski lift tickets.

Employees also can look forward to a welcome reception and banquet, fanny pack, trip brochure and cross country skiing area. In addition, children to age 12 get to ski for free. Additional options also are available including breakfast on the mountain, sleigh rides, snow mobiles, hot air balloon rides and numerous other activities. There also is a basic land package available at a cost of \$694 per person, which includes everything except airfare.

A deposit of \$50 per person is due as soon as possible. For more information call Ron Davis at x31959.

## Science museum seeking volunteers

Claudia Baltodano, recruiter for the Houston Museum of Natural Science volunteer services, will be at JSC from 2-3 p.m. Wednesday in Bldg. 45, Rm. 251 to discuss the museum's volunteer program.

The museum is seeking volunteers to work in all areas of the museum, from interpreting exhibits for children and families, to essential jobs behind the scenes. There are a variety of volunteer opportunities available, depending on volunteers' interests and schedules.

"The Houston Museum of Natural Science is very proud to offer one of the most rewarding and exciting volunteer programs in the Houston area," Baltodano said. "Our volunteer program provides an excellent opportunity for JSC employees to

become more involved in helping children and adults nourish their knowledge in science and encourage them to appreciate and love the world around them."

The museum, founded in 1909, houses the Cockrell Butterfly Center, Burke Baker Planetarium, Wortham IMAX Theatre, the world's first Challenger Learning Center and over a dozen halls of permanent natural science exhibits that the museum hosts each year.

To learn more about the museum and its volunteer program, employees can visit the museum's web site at URL: <http://www.hmns.mus.tx.us:80/hmns/home.html>

Interested employees may attend the Wednesday meeting or call the volunteer office at 639-4643.

## NASA offers managers fellowship programs at universities

JSC employees—primarily in the grade 13 to Senior Executive Service levels—are invited to apply for spots in academically-based programs of study in management and executive processes.

The programs are at universities such as Harvard, the Massachusetts Institute of Technology, Carnegie-

Mellon and Simmons.

The criteria used by headquarters and JSC for selection are the candidate's job performance, education record, development record, significant recognition and accomplishments, purpose for participating in the program and supervisor and management endorsements.

Employees interested in being nominated for any of these management programs must first talk to their supervisor. Nominations are worked through each directorate or program office and are due to the Human Resources Development Branch by next Friday. JSC nominees will be chosen by JSC Director George

Abbey and final selections will be made at NASA Headquarters. Final selections also will be based on the needs of the centers and individual needs. Each director or program manager and training coordinators has a detailed description of the program. For more information call Erica Vandersand at x31999.

## Luncheon reservations for 1996 inventors due today

(Continued from Page 1)

Engineering for the Inflatable Rescue Device; Edgar Castro, Gregg Edeen, David Hamilton, Timothy Pelischek and Irene Verinder of Engineering, James McDede and John Rivers of Mission Operations, Kornel Nagy of the Space Station Project Office and former JSC employees Jon Kahn, Donald Wade and Clarence Wesselski for the Pre-Integrated Truss Space Station and Method of

Assembly; Richard Juday of Engineering for the Full Complex Modulation Using Two One-Parameter Spatial Light Modulators; Kent Castle of Safety Reliability and Quality Assurance for the Extra-Corporeal Blood Access, Sensing and Radiation Methods and Apparatuses; Doug Ming of Space and Life Sciences for the Slow-Release Fertilizer; Erik Evenson and Christian Lupo of Engineering for the Connector Systems for Structures;

Edgar Castro, Horacio de la Fuente, Timothy Pelischek, Steven Rickman and John Schliesing of Engineering, Kornel Nagy of the Space Station Program Office and former JSC employee Reginald Berka, Donald Wade and Clarence Wesselski for the Heavy-Lift Vehicle-Launched Space Station Method and Apparatus; former JSC employee Richard Bozeman for the Accelerometer Having Integral Fault Null and the Control Method for Prosthetic

Devices; Leo Monford of Engineering for the Grapple Fixture for use with Electromagnetic Attachment Mechanism; Donald Henninger of Engineering and Doug Ming of Space and Life Sciences for the Active Synthetic Soil; and former JSC employee Frederic Dawn for Protective Helmet Assembly.

Reservations for the luncheon are due today.

For more information call Mara Pena at x30837.

## Space News Roundup

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